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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	§	
Ajay Kapur et al.	§	Group Art Unit: 2624
	§	
Serial No.: 10/692,450	§	Examiner: Wang, Claire X.
	§	
Filed: October 23, 2003	§	Confirmation No.: 8030
	§	
For: SYSTEMS AND METHODS FOR	§	Atty. Docket: RD28357-1/YOD
VIEWING AN ABNORMALITY IN	§	GERD:0220
DIFFERENT KINDS OF IMAGES	§	
	§	

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October 30, 2009
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/Patrick K. Patnode/
Patrick K. Patnode

APPEAL BRIEF PURSUANT TO 37 C.F.R. §§ 41.31 AND 41.37

This Appeal Brief is being filed in furtherance to the Notice of Appeal electronically filed on August 31, 2009.

The Commissioner is authorized to charge the requisite fee of \$540.00, and any additional fees, which may be necessary to advance prosecution of the present application, to Account No. 070868.

1. REAL PARTY IN INTEREST

The real party in interest is General Electric Company, the Assignee of the above-referenced application by virtue of the Assignment to General Electric Company by Boris Yamrom, Oliver Richard Astley, Ajay Kapur recorded at reel 015058, frame 0174, on

March 10, 2004. Accordingly, General Electric Company, as the Assignee of the above-referenced application, will be directly affected by the Board's decision in the pending appeal.

2. **RELATED APPEALS AND INTERFERENCES**

Appellants are unaware of any other appeals or interferences related to this Appeal. The undersigned is Appellants' legal representative in this Appeal.

3. **STATUS OF CLAIMS**

Claims 1-26 are currently pending and are the subject of this Appeal.

4. **STATUS OF AMENDMENTS**

Appellants have not submitted any amendment subsequent to the Final Office Action mailed on May 29, 2009.

5. **SUMMARY OF CLAIMED SUBJECT MATTER**

The present invention relates generally to imaging. *See* Application, page 1, paragraph 2. More particularly, in certain embodiments, the invention relates to systems and methods for viewing an abnormality in different kinds of images. *See* Application, page 1, paragraph 2.

The Application contains five independent claims, namely, claims 1, 8, 12, 21 and 24. The subject matter of these claims is summarized below.

With regard to the aspect of the invention set forth in independent claim 1, discussions of the recited features of claim 1 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention relates to a method for viewing an abnormality (*e.g.*, 152) in different kinds of images. The method comprises scanning an object using a first imaging system (*e.g.*, 20) to obtain at least a first image of the object (*e.g.*, 152). *See, e.g.*,

id., paragraphs 6, 7, 8-12, 45, 47, 53, 56; 57, 59, 68; *see also* FIGS. 1, 2, 5, 6, 7 and 11-15. The method also comprises determining coordinates of a region of interest (ROI) visible on the first image, wherein the ROI includes the abnormality. *See, e.g., id.*, paragraphs 7, 8-12, 53, 56, 58, 59, 60, 61, 62, and 66; *see also* FIGS. 1, 2, 5, 6, 7 and 11-15. The method further comprises using the coordinates of the ROI to scan the object with a second imaging system (*e.g.*, 14). *See, e.g., id.*, paragraphs 7, 8-12, 39, 52, 56, 58, 64; *see also* FIGS. 1, 2, 5, 6, 7 and 11-15.

With regard to the aspect of the invention set forth in independent claim 8, discussions of the recited features of claim 8 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention relates to a system (*e.g.*, 150) for viewing an abnormality (*e.g.*, 152) in different kinds of images. The system comprises an X-ray imaging system (*e.g.*, 20) configured to scan an object to obtain at least one X-ray image of the object (*e.g.*, 158) *See, e.g., id.*, paragraphs 6, 7, 8-12, 45, 47, 53, 56, 57, 59, 68; *see also* FIGS. 2, 7 and 11-15. The system also comprises a controller (*e.g.*, 40) configured to determine coordinates of a region of interest (ROI) visible on the first image, the ROI including the abnormality; and utilize the coordinates of the ROI to scan the object with an ultrasound imaging system (*e.g.*, 14). *See, e.g., id.*, paragraphs 9, 12, 33, 34, 47, 51, 54; *see also* FIGS. 2, 7 and 11-15.

With regard to the aspect of the invention set forth in independent claim 12, discussions of the recited features of claim 12 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention relates to a method for viewing an abnormality (*e.g.*, 152) in different kinds of images. The method comprises determining coordinates of a region of interest (ROI) visible on an image obtained using a first imaging system (*e.g.*, 20), the ROI including the abnormality. *See, e.g., id.*, paragraphs 23-34; *see also* FIGS. 2 and 4. The method also comprises utilizing the coordinates of the ROI to scan the object with a

second imaging system different from the first imaging system (*e.g.*, 200). *See, e.g., id.*, paragraphs 7, 8-12, 53, 56, 58, 59, 60, 61, 62, and 66; *see also* FIGS. 1, 2, 5, 6, 7 and 11-15. The method further comprises registering 3-dimensional (3D) data relative to 2-dimensional (2D) data, wherein the 3D data is obtained using the second imaging system (*e.g.*, 14) and the 2D data is obtained using the first imaging system. *See, e.g., id.*, paragraphs 7, 8-12, 39, 52, 56, 58, 64; *see also* FIGS. 1, 2, 5, 6, 7 and 11-15.

With regard to the aspect of the invention set forth in independent claim 21, discussions of the recited features of claim 21 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention relates to a method for viewing an abnormality (*e.g.*, 152) in different kinds of images. The method comprises scanning an object using an X-ray imaging system (*e.g.*, 20) to obtain at least one X-ray image of the object (*e.g.*, 158). *See, e.g., id.*, 6, 7, 8-12, 45, 47, 53, 56, 57, 59, 68; *see also* FIGS. 2, 7 and 11-15. The method also comprises determining coordinates of a region of interest (ROI) on the X-ray image, wherein the ROI includes the abnormality. *See, e.g., id.*, paragraphs 7, 8-12, 53, 56, 58, 59, 60, 61, 62, and 66; *see also* FIGS. 1, 2, 5, 6, 7 and 11-15. The method further comprises instructing a probe mover to move a probe to the coordinates to scan a specific region of the object, wherein the specific region is defined by the coordinates. *See, e.g., id.*, paragraphs 7, 8-12, 39, 52, 56, 58, 64; *see also* FIGS. 1, 2, 5, 6, 7 and 11-15. The method further comprises instructing an ultrasound imaging system to scan the specific region of the object to obtain at least one ultrasound image (*e.g.*, 14). *See, e.g., id.*, paragraphs 7, 8-12, 39, 52, 56, 58, 64; *see also* FIGS. 1, 2, 5, 6, 7 and 11-15.

With regard to the aspect of the invention set forth in independent claim 24, discussions of the recited features of claim 24 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention relates to a system (*e.g.*, 150) for viewing an abnormality (*e.g.*, 152) in different kinds of images. The system comprises an X-ray

imaging system (*e.g.*, 20) configured to scan an object to obtain at least one X-ray image of the object (*e.g.*, 158) *See, e.g., id.*, paragraphs 6, 7, 8-12, 45, 47, 53, 56, 57, 59, 68; *see also* FIGS. 2, 7 and 11-15. The system also comprises a controller (*e.g.*, 40) configured to determine coordinates of a region of interest (ROI) visible on the X-ray image, the ROI including the abnormality; utilize the coordinates of the ROI to scan the object with an ultrasound imaging system (*e.g.*, 14); and register 2-dimensional (2D) data from which the X-ray image is generated with 3-dimensional (3D) data obtained by scanning the object with the ultrasound imaging system. *See, e.g., id.*, paragraphs 9, 12, 33, 34, 47, 51, 54; *see also* FIGS. 2, 7 and 11-15.

A benefit of the invention, as recited in these claims, resides in systems and methods for viewing an abnormality in different kinds of images. *See, e.g., id.*, paragraphs 2, 8-12, 54, 55, 58, and 68.

6. GROUND OF REJECTION TO BE REVIEWED ON APPEAL

First Ground of Rejection for Review on Appeal

Whether the Examiner has established a *prima facie* case of non-statutory subject matter of claims 1-7, and 12-23 under 35 USC §101 as being directed toward non-statutory subject matter

Second Ground of Rejection for Review on Appeal

Whether the Examiner has established a *prima facie* case of anticipation of claims 1-3, 6 and 8-10 under 35 U.S.C. §102(b) as being anticipated by Burke et al. (U.S. Patent Number 6,421,454, hereinafter “Burke”).

Third Ground of Rejection for Review on Appeal

Whether the Examiner has established a *prima facie* case of obviousness of claims 4-5, 11-15 and 21-25 under 35 U.S.C. § 103(a) as being unpatentable over Burke in view of Wang et al., US Patent Application No. 2003/0007598. (hereinafter “Wang”).

Fourth Ground of Rejection for Review on Appeal

Whether the Examiner has established a *prima facie* case of obviousness of claims 7, 16, 20 and 26 under 35 U.S.C. § 103(a) as being unpatentable over Burke in view of Fu et al, US Patent Application No. 2005/0047544, (hereinafter “Fu”).

7. ARGUMENT

As discussed in detail below, the Examiner has improperly rejected the pending claims. Further, the Examiner has misapplied long-standing and binding legal precedents and principles in rejecting the claims under Sections 101, 102 and 103. Accordingly, Appellants respectfully request full and favorable consideration by the Board, as Appellants assert that claims 1-26 are currently in condition for allowance.

A. Ground of Rejection No. 1:

The Examiner rejected claims 1-7 and 12-23 were rejected under 35 USC §101 as not falling within one of the four statutory categories of invention. *See*, Final Office Action, page 3, lines 6-7. Appellant respectfully traverses this rejection.

Legal Precedent and Guidelines

“machine-or-transformation test”

To satisfy the requirements under 35 U.S.C. § 101, the invention must satisfy the “machine-or-transformation test.” The machine-or-transformation test is a test of patent eligibility under which a claim to a process qualifies to be considered for patenting only if it (1) is implemented with a particular machine, that is, one specifically devised and adapted to carry out the process in a way that is not concededly conventional and is not trivial; or else (2) transforms an article from one thing or state to another. The test has been articulated most recently in *In re Bilski*, 88 U.S.P.Q.2d 1385 (Fed. Cir 2008), but dates back to the Nineteenth Century. The test is articulated also in the patent-eligibility trilogy *Diamond v. Diehr*, 450 U.S. 175 (1981); *Parker v. Flook*, 437 U.S. 584 (1978); *Gottschalk v Benson*, 409 U.S. 63 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876). In determining

when process or method claims include statutory subject matter, the Supreme Court in *Diehr* stated that “[t]ransformation and reduction of an article ‘to a different state or thing’ is the clue to the patentability of a process claim *that does not include particular machines.*” See *id.* 450 U.S. at 183-185, 209 U.S.P.Q. at 6. Emphasis added.

The “machine-or-transformation test” is a two-branched inquiry; an applicant may show that a process claim satisfies § 101 either by showing that his claim is tied to a particular machine, or by showing that his claim transforms an article. See *Benson*, 409 U.S. at 70. Certain considerations are applicable to analysis under either branch. First, as illustrated by *Benson* and discussed below, the use of a specific machine or transformation of an article must impose meaningful limits on the claim's scope to impart patent-eligibility. See *Benson*, 409 U.S. at 71-72. Second, the involvement of the machine or transformation in the claimed process must not merely be insignificant extra-solution activity. See *Flook*, 437 U.S. at 590.

Referring to the instant application, independent claim 1 recites, *inter alia*, “a method for viewing an abnormality in different kinds of images.” Claim 12 recites, *inter alia*, “a method for viewing an abnormality in different kinds of images.” Additionally, independent claim 21 recites, *inter alia*, “a method for viewing an abnormality in different kinds of images.”

In the Office Action mailed on May 29, 2009, page 4, the Examiner quoted from the Supreme Court precedent and recent Federal Circuit decisions that apparently indicated that a statutory process under 35 USC §101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing. The Examiner further stated that while the instant claims recite a series of steps or acts to be performed, the claims neither transform underlying subject matter nor positively tie to another statutory category that accomplishes

the claimed method steps, and therefore do not qualify as a statutory process. *See*, Office Action, page 3, lines 1-14. Appellant respectfully traverses this rejection.

In response to the comments of the Examiner stated above, the Appellant respectfully state that in view of the cases quoted above, case law has taken a measured approach to this question, and it may be reasonable here to interpret the boundaries of what constitutes patent-eligible transformations of articles. Specifically, Appellant respectfully asserts that the independent claims 1, 12 and 21 taken as a whole each recite statutory subject matter under 35 USC § 101 because (1) each of them is tied to another statutory category (such as a particular apparatus), or (2) each of them transforms underlying subject matter (such as an article or material) to a different state or thing.

Further, appellant respectfully states that each claim, as stated above, taken as a whole, recites either a method, or a system for method for viewing an abnormality in different kinds of images. Appellant further asserts that these methods, systems and machine readable media therefore stand the “machine-or-transformation test” of patent eligibility. For example, these methods and systems may be used for scanning an object using a first imaging system to obtain at least a first image of the object; determining coordinates of a region of interest (ROI) visible on the first image, wherein the ROI includes the abnormality; and using the coordinates of the ROI to scan the object with a second imaging system, as described in detail in the present Application. *See* Application, pages 7-17. Accordingly, Appellant respectfully request withdrawal of the rejection of independent claims 1, 12, 20, and 21, as well as all claims dependent thereon, under 35 U.S.C. §101.

Further, we believe the above legal points have been clarified by the U.S.P.T.O. in an attempt to stem Examiner errors in formulating rejections under 35 U.S.C. §101. In particular, John J. Love, the Deputy Commissioner for Patent Examination Policy issued a memo to the Technology Center Directors on April 12, 2007 titled: “**Clarification of Interim Guidelines for Examination of Patent Applications for Subject Matter**

Eligibility". A copy of this memo has been attached as an Exhibit for the Examiner's convenience. The points made in this memo accord with those points noted above by the Appellant. In particular, as noted by the Deputy Commissioner:

It is the result that should be the focus. If the result has a real world practical application/use, then the test has been satisfied. The claim need not include the uses to which the result is ultimately put, just the result itself. Another example would be an improved method for measuring blood sugar levels in human beings. In this example, the end result is the blood sugar level which is a practical application for diagnostic purposes. Accordingly, reciting the improved method, and the result is achieves --- the measurement of the blood sugar level --- is all that is necessary for patent eligibility. The diagnostic steps that occur after the determination of the blood sugar level need not necessarily be present in the claims in order for the claims to be statutory.

Memo, dated April 12, 2007 by Deputy Commissioner John Love.

Thus as explained in the present specification and in the preceding discussion, the act of "directly inverting a respective Hessian matrix corresponding to each subset of pixels such that the pixels of each subset are simultaneously optimized with regard to a cost function" as recited in independent claims 1, 12 and 21 has a real world practical application in the generation of medical or diagnostic images. As explained by Deputy Commissioner Love, no more is required for the claims to be statutory. Therefore, the Appellant respectfully reiterate the request that the rejection of independent claims 1, 12 and 21, as well as all claims dependent thereon, under 35 U.S.C. §101 be withdrawn.

Further, in this connection, it may be pertinent to refer to the following sections from the United States Patent and Trademark Office (USPTO)'s *Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility*, section IV, paragraph C, titled "*Determine Whether the Claimed Invention Falls Within Sec. 101 Judicial Exceptions - Laws of Nature, Natural Phenomena and Abstract Ideas*".

In particular, the text in section IV, paragraph C of the USPTO guidelines mentioned above reads:

While abstract ideas, natural phenomena, and laws of nature are not eligible for patenting, methods and products employing abstract ideas, natural phenomena, and laws of nature to perform a real-world function may well be. In evaluating whether a claim meets the requirements of section 101, the claim must be considered as a whole to determine whether it is for a particular application of an abstract idea, natural phenomenon, or law of nature, rather than for the abstract idea, natural phenomenon, or law of nature itself.

Further, section IV, paragraph C, part 2 entitled "Determine Whether the Claimed Invention is a Practical Application of an Abstract Idea, Law of Nature, or Natural Phenomenon Sec. 101(Judicial Exceptions)" reads:

To satisfy section 101 requirements, the claim must be for a practical application of the Sec. 101 judicial exception, which can be identified in various ways:

The claimed invention "transforms" an article or physical object to a different state or thing.

The claimed invention otherwise produces a useful, concrete and tangible result, based on the factors discussed below.

Appellant respectfully submits that independent claims 1, 12 and 21 are limited to particular practical applications in the technological arts. Specifically, each of the independent claims 1, 12 and 21 in its current version recites a method or system for viewing an abnormality in different kinds of images. The particular practical applications include scanning an object using a first imaging system to obtain at least a first image of the object; determining coordinates of a region of interest (ROI) visible on the first image, wherein the ROI includes the abnormality; and using the coordinates of the ROI to scan the object with a second imaging system, as described in detail in the present Application. In other words, the claimed invention "transforms" a tangible article, and acts on, but is not itself an abstract

idea. The claimed invention, as recited in independent claims 1, 12 and 21, therefore as a whole recites statutory subject matter under 35 USC § 101 because (1) each of the independent claims is tied to another statutory category (such as a particular apparatus), or (2) each of the independent claims transforms underlying subject matter (such as an article or material) to a different state or thing. Moreover, the description contained in the specification is replete with specific examples of applications of the claimed method and system.

Further, in the "Response to Arguments" section, on page 2 of the Final Office Action mailed on May 29, 2009, the Examiner responded to the Appellants' arguments submitted in the previous response filed on March 02, 2009 in relation to rejection of claims 1-7 and 12-23 were under 35 USC §101. The Examiner stated that while the claims disclose a system on which the method is operating it is noted that the mere use of the machine to collect data necessary for application of the mental process may not make the claims patentable subject matter. The Examiner further added that nominal or token recitations of structure in a method claim should not convert an otherwise ineligible claims into an eligible one. The Examiner also commented that the process does not transform the images into a different state and thus does not meet the transformation requirements.

In response to the Examiner's comments recited above, Appellants respectfully reiterate that first, as to the 'machine' implementation of "machine-or-transformation test", the language of claim 1 ties up the underlying process steps to the specific machine or system claimed in independent claims 8. In a similar manner, the language of claim 12 ties up the underlying process steps to the specific machine or system claimed in independent claim 24. Further, the language of claim 21 ties up the underlying process steps to the specific machine or system claimed in independent claim 24 and dependent claim 25.

Second, as to the 'transformation' implementation of "machine-or-transformation test", a claimed process is patent-eligible if it transforms an article into a different state or thing. This transformation must be central to the purpose of the claimed process. But the

main aspect of the transformation test that requires clarification here is what sorts of things constitute "articles" such that their transformation is sufficient to impart patent-eligibility under § 101. It is virtually self-evident that a process for a chemical or physical transformation of physical objects or substances is patent-eligible subject matter. As the Supreme Court stated in *Benson* 409 U.S. at 70 (quoting *Corning v. Burden*, 56 U.S. (15 How.) 252, 267-68 (1854)):

[T]he arts of tanning, dyeing, making waterproof cloth, vulcanizing India rubber, smelting ores . . . are instances, however, where the use of chemical substances or physical acts, such as temperature control, changes articles or materials. The chemical process or the physical acts which transform the raw material are, however, sufficiently definite to confine the patent monopoly within rather definite bounds.

see also Diehr, 450 U.S. at 184 (process of curing rubber); *Tilghman*, 102 U.S. at 729 (process of reducing fats into constituent acids and glycerine).

Referring to the instant application, the Appellant believes that the process claimed in each of independent claims 1, 12 and 21 is patent-eligible because it transforms the coordinates of a region of interest (ROI) visible on the first image of an object scanned using a first imaging system, wherein the ROI includes the abnormality to the coordinates of the ROI to a second imaging system for scanning the object with. Therefore, contrary to the Examiner's statements, the process of the current Application does transform the images into a different state and thus believed to meet the transformation requirements. Further, contrary to the Examiner's comment, this transformation is central to the purpose of the claimed process and not merely nominal or token recitations of structure in a method claim.

Appellant therefore request that the Examiner considers the independent claims 1, 12 and 21 as a whole to determine that the invention is *falling within one of the four statutory categories of invention* and withdraw the rejection of independent claims 1, 12 and 21 under 35 U.S.C. §101. Further, Appellant respectfully submits that claims 2-7, 13-19, and

22-23 depend directly or indirectly from claims 1, 12 and 21 respectively. Accordingly, the Appellant submits that claims 2-7, 13-19, and 22-23 are allowable by virtue of their dependency from allowable base claims.

B. Ground of Rejection No. 2:

The Examiner rejected claims 1-3, 6 and 8-10 under 35 U.S.C. §102(b) as being anticipated by Burke. Of these, claims 1 and 8 are independent claims. Appellant respectfully traverses this rejection by highlighting the arguments presented in the previous Office Action with respect to the coordination system that is missing in the Burke's reference.

Legal Precedent and Guidelines

First, the pending claims must be given an interpretation that is reasonable and consistent with the *specification*. See *In re Prater*, 415 F.2d 1393, 1404-05, 162 U.S.P.Q. 541, 550-51 (C.C.P.A. 1969) (emphasis added); see also *In re Morris*, 127 F.3d 1048, 1054-55, 44 U.S.P.Q.2d 1023, 1027-28 (Fed. Cir. 1997); see also M.P.E.P. §§ 608.01(o) and 2111. Indeed, the specification is "the primary basis for construing the claims." See *Phillips v. AWH Corp.*, No. 03-1269, -1286, at 13-16 (Fed. Cir. July 12, 2005) (*en banc*). One should rely *heavily* on the written description for guidance as to the meaning of the claims. See *id.*

Second, interpretation of the claims must also be consistent with the interpretation that *one of ordinary skill in the art* would reach. See *In re Cortright*, 165 F.3d 1353, 1359, 49 U.S.P.Q.2d 1464, 1468 (Fed. Cir. 1999); M.P.E.P. § 2111. "The inquiry into how a person of ordinary skill in the art understands a claim term provides an objective baseline from which to begin claim interpretation." See *Collegenet, Inc. v. ApplyYourself, Inc.*, 418 F.3d 1225, 75 U.S.P.Q.2d 1733, 1738 (Fed. Cir. 2005) (quoting *Phillips v. AWH Corp.*, 75 U.S.P.Q.2d 1321, 1326). The Federal Circuit has made clear that derivation of a

claim term must be based on “usage in the ordinary and accustomed meaning of the words amongst artisans of ordinary skill in the relevant art.” *See id.*

Third, anticipation under section 102 can be found only if a single reference shows exactly what is claimed. *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 U.S.P.Q. 773 (Fed. Cir. 1985). For a prior art reference to anticipate under section 102, every element of the claimed invention must be identically shown in a single reference. *In re Bond*, 910 F.2d 831, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990). To maintain a proper rejection under section 102, a single reference must teach each and every limitation of the rejected claim. *Atlas Powder v. E.I. du Pont*, 750 F.2d 1569 (Fed. Cir. 1984). Accordingly, the Appellants need only point to a single element not found in the cited reference to demonstrate that the cited reference fails to anticipate the claimed subject matter. The prior art reference also must show the *identical* invention “*in as complete detail as contained in the ... claim*” to support a *prima facie* case of anticipation. *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 U.S.P.Q. 2d 1913, 1920 (Fed. Cir. 1989).

Fourth, if the Examiner relies on a theory of inherency, the extrinsic evidence must make clear that the missing descriptive matter is *necessarily* present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. *In re Robertson*, 169 F.3d 743, 49 U.S.P.Q.2d 1949 (Fed. Cir. 1999) (Emphasis Added). The mere fact that a certain thing *may* result from a given set of circumstances is not sufficient. *Id.* In relying upon the theory of inherency, the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic *necessarily* flows from the teachings of the applied prior art. *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original). The Examiner, in presenting the inherency argument, bears the evidentiary burden and must adequately satisfy this burden. *See id.* Regarding functional limitations, the Examiner must evaluate and consider the functional limitation, just like any other limitation of the claim, for what it fairly conveys to a person of ordinary skill in the pertinent art in the context in which

it is used. See M.P.E.P. § 2173.05(g); *In re Swinehart*, 169 U.S.P.Q. 226, 229 (C.C.P.A. 1971); *In re Schreiber*, 44 U.S.P.Q.2d 1429, 1432 (Fed. Cir. 1997). If the Examiner believes the functional limitation to be inherent in the cited reference, then the Examiner “must provide some evidence or scientific reasoning to establish the reasonableness of the examiner’s belief that the functional limitation is an inherent characteristic of the prior art.” *Ex parte Skinner*, 2 U.S.P.Q.2d 1788, 1789 (Bd. Pat. App. & Inter. 1986).

Fifth, the *drawings* of the cited reference must be evaluated for what they *reasonably disclose and suggest* to one of ordinary skill in the art. *In re Aslanian*, 590 F.2d 911, 200 U.S.P.Q. 500 (CCPA 1979). Arguments based on dimensions of the drawing features are of little value where the reference does not disclose specific dimensions or any indication of whether the drawings are to scale. See *Hockerson-Halberstadt, Inc. v. Avia Group Int’l*, 222 F.3d 951, 956, 55 U.S.P.Q.2d 1487, 1491 (Fed. Cir. 2000).

Sixth, it is improper for the Examiner to rely on the abstract rather than the underlying document itself, particularly in the case of foreign language references. See *Ex parte Jones*, 62 U.S.P.Q.2d 1206 (PTO Bd. App. 2001); see M.P.E.P. § 706.02. As noted by the Board of Patent Appeals and Interferences, the reliance on abstracts is problematic, because abstracts are often prone to erroneous or incomplete descriptions of the invention. “A proper examination under 37 C.F.R. § 1.104 should be based on the underlying documents and translations, where needed.” *Id.* As set forth in Section 706.02 of the Manual of Patent Examining Procedure, if a prior art reference is in a language other than English and the examiner seeks to rely on that document, a translation must be obtained so that the record is clear as to the precise facts the examiner is relying on in support of the rejection.

Seventh, as set forth in Section 706 of the Manual of Patent Examining Procedure, the goal of examination is to clearly articulate any rejection early in the prosecution process so that the Appellants have the opportunity to provide evidence of patentability and

otherwise reply completely at the earliest opportunity. The Examiner should never overlook the importance of his or her role in allowing claims, which properly define the invention. See M.P.E.P. § 706.

A prima facie case of anticipation under 35 USC §102 requires showing that each limitation of a claim is found in a single reference, practice or device. Appellant respectfully asserts that the present invention, as recited in independent claims 1 and 8 are patentable over the Burke reference. To sustain a rejection under USC §102, a single reference must disclose each and every element of the claimed invention, the elements being configured in such a way as to fully disclose the claimed invention. The Appellant urge that the rejection of the present independent claims 1 and 8 under 35 USC §102 (b) as being anticipated by the Burke reference is unwarranted because the Burke reference does not disclose each and every element of the claimed invention, specifically the cited claim elements of the present independent claims 1 and 8.

The Appellant respectfully state that Burke fails to disclose each and every element of the independent claim 1 and specifically, the recitations of *scanning an object using a first imaging system to obtain at least a first image of the object; determining coordinates of a region of interest (ROI) visible on the first image, wherein the ROI includes the abnormality; and using the coordinates of the ROI to scan the object with a second imaging system*. In a similar manner, Burke fails to disclose each and every element of the independent claim 8 and specifically, the recitations of *an X-ray imaging system configured to scan an object to obtain at least one X-ray image of the object; and a controller configured to: determine coordinates of a region of interest (ROI) visible on the first image, the ROI including the abnormality; and utilize the coordinates of the ROI to scan the object with an ultrasound imaging system*.

The Examiner stated in Page 2 of the Office Action dated December 2, 2008 that the Burke reference teaches a method for viewing an abnormality in different kinds of images

(optical correlator assisted detection for breast biopsy; Title), said method comprising scanning an object using a first imaging system to obtain at least a first image of the object (a film scanner scans in the radiographic image into the system and registers by a coarse registration step; col 15, lines 7-22); determining coordinates of a region of interest (ROI) visible on the first image (a ROI can be identified by a computer aided diagnosis system; col 15, lines 31-32 since the ROI is identified by a computer then the coordinate must be determined), wherein the ROI includes the abnormality (system for breast biopsy; Title); and using the coordinates of the ROI to scan the object with a second imaging system (the ROI of the breast is then scanned by ultrasonographic equipment at a high resolution setting; col 15, lines 42-45).

The Appellant refers to the paragraphs cited by the Examiner and respectfully states that Burke discloses a method of imaging small objects such as calcifications in a bodily tissue. The method includes the steps of providing radiographic image data from an identified region of interest (ROI) of the tissue using a first imaging unit; providing three-dimensional ultrasonographic image data corresponding to *substantially the same ROI either before or after said radiographic image data is provided* and using a second imaging unit independent of said first imaging unit such that said ROI need not be *identically positioned for both radiographic and ultrasonographic image acquisition*. Nowhere Burke discloses *scanning an object using a first imaging system to obtain at least a first image of the object; determining coordinates of a region of interest (ROI) visible on the first image, wherein the ROI includes the abnormality; and using the coordinates of the ROI to scan the object with a second imaging system*.

Furthermore, in the "Response to Arguments" section, on page 3 of the Final Office Action mailed on May 29, 2009, the Examiner responded to the Appellants' arguments in relation to rejection of claims 1-3, 6 and 8-10 under 35 USC 102(b) as anticipated by Burke. The Examiner referred to column 5, lines 25-26, column 15, lines 7-22, 31-32, 41-45 and stated that Burke teaches an x-ray or other radiographic device used to image the breast and the image is scanned into the system and registered by a coarse registration step.

The Examiner further stated that Burke teaches that a ROI is identified and then the corresponding ROI in the actual breast is then scanned an ultrasound.

Appellant referred to the cited paragraphs and texts and respectfully submits that in the cited paragraphs and texts, Burke merely discloses a method of imaging small objects such as calcifications in a bodily tissue. The method includes the steps of providing radiographic image data from an identified region of interest (ROI) of the tissue using a first imaging unit; providing three-dimensional ultrasonographic image data corresponding to substantially the same ROI either before or after said radiographic image data is provided and using a second imaging unit independent of said first imaging unit such that said ROI need not be identically positioned for both radiographic and ultrasonographic image acquisition. Nowhere Burke discloses scanning an object using a first imaging system to obtain at least a first image of the object; *determining coordinates of a region of interest (ROI) visible on the first image*, wherein the ROI includes the abnormality; and using the coordinates of the ROI to scan the object with a second imaging system.

Appellant respectfully submits that, in view of these distinctions, Burke cannot anticipate independent claims 1 and 8. Claims 2-3 and 6 depend directly or indirectly from independent claim 1; and claims 9-10 depend from independent claim 8 are therefore believed to be patentable by dependency. Accordingly, the Appellant submit that the Burke reference cannot establish a *prima facie* case of anticipation of claims 1-3, 6 and 8-10, and respectfully requests the Examiner to withdraw the rejection of these claims under Section 102(b) based on the Burke reference.

C. Ground of Rejection No. 3:

The Examiner rejected claims 4-5, 11-15 and 21-25 under 35 USC §103(a) as being unpatentable over Burke in view of Wang. Appellant respectfully traverses the rejection of these claims.

Legal Precedent and Guidelines

The pending claims must be given an interpretation that is reasonable and consistent with the *specification*. See *In re Prater*, 415 F.2d 1393, 1404-05, 162 U.S.P.Q. 541, 550-51 (C.C.P.A. 1969) (emphasis added); see also *In re Morris*, 127 F.3d 1048, 1054-55, 44 U.S.P.Q.2d 1023, 1027-28 (Fed. Cir. 1997); see also M.P.E.P. §§ 608.01(o) and 2111. Indeed, the specification is “the primary basis for construing the claims.” See *Phillips v. AWH Corp.*, No. 03-1269, -1286, at 13-16 (Fed. Cir. July 12, 2005) (*en banc*). One should rely *heavily* on the written description for guidance as to the meaning of the claims. See *id.*

Interpretation of the claims must also be consistent with the interpretation that *one of ordinary skill in the art* would reach. See *In re Cortright*, 165 F.3d 1353, 1359, 49 U.S.P.Q.2d 1464, 1468 (Fed. Cir. 1999); M.P.E.P. § 2111. “The inquiry into how a person of ordinary skill in the art understands a claim term provides an objective baseline from which to begin claim interpretation.” See *Collegenet, Inc. v. ApplyYourself, Inc.*, 418 F.3d 1225, 75 U.S.P.Q.2d 1733, 1738 (Fed. Cir. 2005) (quoting *Phillips v. AWH Corp.*, 75 U.S.P.Q.2d 1321, 1326). The Federal Circuit has made clear that derivation of a claim term must be based on “usage in the ordinary and accustomed meaning of the words amongst artisans of ordinary skill in the relevant art.” See *id.*

The burden of establishing a *prima facie* case of obviousness falls on the Examiner. *Ex parte Wolters and Kuypers*, 214 U.S.P.Q. 735 (PTO Bd. App. 1979). In addressing obviousness determinations under 35 U.S.C. § 103, the Supreme Court in *KSR International Co. v. Teleflex Inc.*, No. 04-1350 (April 30, 2007), reaffirmed many of its precedents relating to obviousness including its holding in *Graham v. John Deere Co.*, 383 U.S. 1 (1966). In *Graham*, the Court set out an objective analysis for applying the statutory language of §103:

Under §103, the scope and content of the prior art are to be determined, differences between the prior art and the claims at issue are to be ascertained, and the level of ordinary skill in the pertinent art are to be resolved. Against this background the obviousness or non-obviousness of the subject matter is to be determined. Such secondary considerations as commercial success,

long-felt but unresolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. *KSR, slip op.* at 2 (citing *Graham*, 383 U.S. at 17-18).

In *KSR*, the Court also reaffirmed that “a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *Id.* at 14. In this regard, the *KSR* court stated that “it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does ... because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known.” *Id.* at 14-15. Traditionally, to establish a *prima facie* case of obviousness, the CCPA and the Federal Circuit have required that the prior art not only include all of the claimed elements, but also some teaching, suggestion, or motivation to combine the known elements in the same manner set forth in the claim at issue. *See, e.g., ASC Hospital Systems Inc. v. Montifiore Hospital*, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984) (holding that obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent some teaching or suggestion supporting the combination.); *In re Mills*, 16 U.S.P.Q.2d 1430, 1433 (Fed. Cir. 1990) (holding that the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination). In *KSR*, the court noted that the demonstration of a teaching, suggestion, or motivation to combine provides a “helpful insight” in determining whether claimed subject matter is obvious. *KSR, slip op.* at 14. However, the court rejected a *rigid* application of the “TSM” test. *Id.* at 11. In this regard, the court stated:

The obviousness analysis cannot be confined by a formalistic conception of the words teaching, suggestion, and motivation, or by overemphasis on the importance of published articles and explicit content of issued patents. The diversity of inventive pursuit and of modern technology counsels against limiting the analysis in this way. In many fields it may be that there is little discussion of obvious techniques or combinations, and it often may be the

case that market demand, rather than scientific literature, will drive design trends. *Id.* at 15.

In other words, the *KSR* court rejected a rigid application of the TSM test which requires that a teaching, suggestion or motivation to combine elements in a particular manner must be explicitly found in the cited prior art. Instead, the *KSR* court favored a more expansive view of the sources of evidence that may be considered in determining an apparent reason to combine known elements by stating:

Often, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art all in order to determine whether there was an apparent reason to combine in the known elements in the fashion claimed in the patent at issue. *Id.* at 14.

The *KSR* court also noted that there is not necessarily an inconsistency between the idea underlying the TSM test and the *Graham* analysis, and it further stated that the broader application of the TSM test found in certain Federal Circuit decisions appears to be consistent with *Graham*. *Id.* at 17-18 (citing *DyStar Textilfarben GmbH and Co. v. C.H. Patrick Co.*, 464 F.3d 1356, 1367 (2006) (“Our suggestion test is in actuality quite flexible and not only permits but *requires* consideration of common knowledge and common sense”); *Alza Corp. v. Mylan Labs, Inc.*, 464 F.3d 1286, 1291 (2006) (“There is flexibility in our obviousness jurisprudence because a motivation may be found *implicitly* in the prior art. We do not have a rigid test that requires a teaching to combine ... “)).

Furthermore, the *KSR* court did not diminish the requirement for objective evidence of obviousness. *Id.* at 14 (“To facilitate review, this analysis should be made explicit. See *In re Kahn*, 441 F.3d 977, 988 (CA Fed. 2006) (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”). As our precedents make clear, however, the analysis need not seek out precise teachings

directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.”); *see also, In re Lee*, 61 U.S.P.Q.2d 1430, 1436 (Fed. Cir. 2002) (holding that the factual inquiry whether to combine references must be thorough and searching, and that it must be based on *objective evidence of record*).

When prior art references require a selected combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gained from the invention itself, i.e., something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination. *Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 U.S.P.Q.2d 1434 (Fed. Cir. 1988). One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). The Federal Circuit has warned that the Examiner must not, “fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher.” *In re Dembiczak*, F.3d 994, 999, 50 U.S.P.Q.2d 52 (Fed. Cir. 1999) (quoting *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 U.S.P.Q. 303, 313 (Fed. Cir. 1983)).

It is improper to combine references where the references teach away from their combination. *In re Grasselli*, 713 F.2d 731, 743, 218 U.S.P.Q. 769, 779 (Fed. Cir. 1983); M.P.E.P. § 2145. Moreover, if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 U.S.P.Q. 349 (CCPA 1959); *see* M.P.E.P. § 2143.01(VI). If the proposed modification or combination would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984); *see* M.P.E.P. § 2143.01(V).

In addition, “it is well established that product claims may include process steps to wholly or partially define the claimed product.” *In re Luck*, 177 U.S.P.Q. 523, 525 (C.C.P.A. 1973). To the extent that “these process limitations distinguish the *product* over the prior art, they must be given the same consideration as traditional product characteristics.” *Id.* (emphasis in original). These claims are not product-by-process claims. A product-by-process claim defines a product by laying out the method steps required to produce the product. *See Atlantic Thermoplastics Co. Inc. v. Faytex Corp.*, 23 U.S.P.Q.2d 1481, 1490 (Fed. Cir. 1992). This is far different from a mixed limitation or hybrid claim that includes a functional limitation, but does not define the product solely by method steps. The general rule for interpreting hybrid claims is that all limitations are to be given patentable effect. *See In re Angstadt*, 190 U.S.P.Q. 214, 217 (C.C.P.A. 1976).

In order to rely on equivalence as a rationale supporting an obviousness rejection, the equivalency must be recognized in the prior art, and cannot be based on Appellant’s disclosure or the mere fact that the components at issue are functional or mechanical equivalents. *In re Ruff*, 256 F.2d 590, 118 U.S.P.Q. 340 (CCPA 1958); *see also* M.P.E.P. § 2144.06.

Appellant respectfully submits that the primary reference Burke does not teach, suggest, or disclose each and every element of the independent claim 1 and specifically the recitations of scanning an object using a first imaging system to obtain at least a first image of the object; determining coordinates of a region of interest (ROI) visible on the first image, wherein the ROI includes the abnormality; and using the coordinates of the ROI to scan the object with a second imaging system. In a similar manner, Burke does not teach, suggest, or disclose each and every element of the independent claim 8 and specifically, the recitations of an X-ray imaging system configured to scan an object to obtain at least one X-ray image of the object; and a controller configured to: determine coordinates of a region of interest (ROI) visible on the first image, the ROI including the abnormality; and utilize the

coordinates of the ROI to scan the object with an ultrasound imaging system. In a similar manner, Burke does not teach, suggest, or disclose each and every element of the independent claim 12 and specifically the recitations of determining coordinates of a region of interest (ROI) visible on an image obtained using a first imaging system, the ROI including the abnormality; utilizing the coordinates of the ROI to scan the object with a second imaging system different from the first imaging system; and registering 3-dimensional (3D) data relative to 2-dimensional (2D) data, wherein the 3D data is obtained using the second imaging system and the 2D data is obtained using the first imaging system. In a similar manner, Burke does not teach, suggest, or disclose each and every element of the independent claim 21 and specifically, the recitations of scanning an object using an X-ray imaging system to obtain at least one X-ray image of the object; determining coordinates of a region of interest (ROI) on the X-ray image, wherein the ROI includes the abnormality; instructing a probe mover to move a probe to the coordinates to scan a specific region of the object, wherein the specific region is defined by the coordinates; and instructing an ultrasound imaging system to scan the specific region of the object to obtain at least one ultrasound image. In a similar manner, Burke does not teach, suggest, or disclose each and every element of the independent claim 24 and specifically, the recitations of an X-ray imaging system configured to scan an object to obtain at least one X-ray image of the object; and a controller configured to determine coordinates of a region of interest (ROI) visible on the X-ray image, the ROI including the abnormality; utilize the coordinates of the ROI to scan the object with an ultrasound imaging system; and register 2-dimensional (2D) data from which the X-ray image is generated with 3-dimensional (3D) data obtained by scanning the object with the ultrasound imaging system. Therefore, the Appellant believes that Burke does not render the independent claims 1, 8, 12, 21, and 24 unpatentable under 35 USC §103(a).

Further, the secondary reference of Wang does not overcome these deficiencies of Burke. Wang teaches a coordinated analysis process by which previously acquired X-ray and ultrasound images are analyzed independently. The ultrasound viewings in Wang's reference are conducted independently on the monitor of the ultrasound machine in real-time

without referring to any x-ray mammogram information that may exist for the patient. Moreover, there appears to be no indication that coordinates of an ROI obtained using either the ultrasound or X-ray mammography system are used in the image acquisition processes of the other imaging system. Thus, Wang does not appear to disclose that coordinates of an ROI, as determined using a first system, are used to scan the object with a second imaging system. Therefore, Wang fails to obviate the deficiencies in the teachings of Burke.

Thus, none of the cited references either taken alone or in any hypothetical combination, specifically teach or suggest or disclose the invention as recited in independent claims 1, 8, 12, 16, 20, 21, and 24 and specifically the recitations of scanning an object using a first imaging system to obtain at least a first image of the object; determining coordinates of a region of interest (ROI) visible on the first image, wherein the ROI includes the abnormality; and using the coordinates of the ROI to scan the object with a second imaging system. Accordingly, Appellant respectfully submits that a prima facie case of obviousness cannot be established for independent claims 1, 8, 12, 21, and 24. Consequently, the dependent claims are allowable at least by virtue of their dependency from respective allowable base claims. Claims 4-5 depend directly or indirectly from independent claim 1; claim 11 depends from independent claim 8; claims 13-15 depend directly or indirectly from independent claim 12; claims 22-23 depend directly or indirectly from independent claim 21 and are therefore believed to be patentable by dependency. Accordingly, the Appellant submit that the cited references cannot establish a prima facie case of obviousness of claims 4-5, 11-15, and 21-25; and respectfully requests the Examiner to withdraw the rejection of these claims under Section 103(a) based on the Burke reference.

D. Ground of Rejection No. 4:

The Examiner rejected claims 7, 16, 20 and 26 under 35 USC §103(a) as being unpatentable over Burke in view of Fu. Appellant respectfully traverses the rejection of these claims.

Appellant respectfully submits that as stated in details in relation to the Ground of Rejection No. 3 above, the primary reference Burke does not teach, suggest, or disclose each and every element of the independent claims 1, 8, 12, 21, and 24 and specifically the recitations of scanning an object using a first imaging system to obtain at least a first image of the object; determining coordinates of a region of interest (ROI) visible on the first image, wherein the ROI includes the abnormality; and using the coordinates of the ROI to scan the object with a second imaging system. Therefore, the Appellant believes that Burke does not render the independent claims 1, 8, 12, 21, and 24 unpatentable under 35 USC §103(a).

Further, the secondary reference of Fu does not overcome these deficiencies of Burke. Fu teaches a method and system provided for registering a 2D radiographic image of a target with previously generated 3D scan data of the target. Specifically, Fu fails to disclose determining coordinates of a region of interest (ROI) visible on the first image, wherein the ROI includes the abnormality or using the coordinates of the ROI to scan the object with a second imaging system. Therefore, Fu fails to obviate the deficiencies in the teachings of Burke.

Thus, none of the cited references either taken alone or in any hypothetical combination, specifically teach or suggest or disclose the invention as recited in independent claims 1, 8, 12, 16, 20, 21, and 24. Accordingly, Appellant respectfully submits that a prima facie case of obviousness cannot be established for independent claims 1, 8, 12, 21, and 24. Consequently, the dependent claims are allowable at least by virtue of their dependency from respective allowable base claims. Claim 7 depends directly or indirectly from independent claim 1; claims 16 and 20 depend directly or indirectly from independent claim 12; and claim 26 depends directly from independent claim 24 are therefore believed to be patentable by dependency. Accordingly, the Appellant submit that the cited references cannot establish a prima facie case of obviousness of claims 7, 16, 20, 26 and respectfully requests the Examiner to withdraw the rejection of these claims under Section 103(a) based on the Burke reference

Conclusion

In view of the remarks and amendments set forth above, Appellants respectfully request allowance of the pending claims. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

Date: October 30, 2009

/Patrick K. Patnode/

Patrick K. Patnode
Reg. No. 40,121

General Electric Company
One Research Circle
Building K1, Room 3A54A
Niskayuna, New York 12309
Telephone: (518) 387-5286

8. **APPENDIX OF CLAIMS ON APPEAL**

Listing of Claims:

Claim 1. A method for viewing an abnormality in different kinds of images, said method comprising:

scanning an object using a first imaging system to obtain at least a first image of the object;

determining coordinates of a region of interest (ROI) visible on the first image, wherein the ROI includes the abnormality; and

using the coordinates of the ROI to scan the object with a second imaging system.

Claim 2. A method in accordance with Claim 1 wherein determining coordinates of the ROI visible on the first image comprises manually marking the ROI on a display device that displays the first image.

Claim 3. A method in accordance with Claim 1 wherein determining coordinates of the ROI visible on the first image comprises automatically marking the ROI by using a computer-aided diagnosis (CAD) algorithm.

Claim 4. A method in accordance with Claim 1 wherein using the coordinates of the ROI to scan the object with a second imaging system comprises:

instructing a probe mover to move a probe to the coordinates to scan a specific region of the object, wherein the specific region is defined by the coordinates; and

scanning the specific region of the object with the second imaging system to obtain at least one second image.

Claim 5. A method in accordance with Claim 4 further comprising displaying the first and the second images concurrently to enable a user to view the abnormality.

Claim 6. A method in accordance with Claim 1 further comprising registering 2-dimensional (2D) data from which the first image is generated with 3-dimensional (3D) data obtained by scanning the object with the second imaging system.

Claim 7. A method in accordance with Claim 6 wherein registering 2D data from which the first image is generated with 3D data comprises:

obtaining at least six equations having at least six unknowns, wherein each equation establishes a relationship between coordinates of 2D data acquired from the first imaging system and coordinates of 3D data acquired from the second imaging system; and

solving the six equations to obtain the six unknowns.

Claim 8. A system for viewing an abnormality in different kinds of images, said system comprising:

an X-ray imaging system configured to scan an object to obtain at least one X-ray image of the object; and

a controller configured to:

determine coordinates of a region of interest (ROI) visible on the first image, the ROI including the abnormality; and

utilize the coordinates of the ROI to scan the object with an ultrasound imaging system.

Claim 9. A system in accordance with Claim 8 wherein to determine coordinates of the ROI visible on the X-ray image the controller is configured to enable manual marking of the ROI on a display device that displays the first image.

Claim 10. A system in accordance with Claim 8 wherein to determine coordinates of the ROI visible on the X-ray image the controller is configured to mark the ROI by using a computer-aided diagnosis (CAD) algorithm.

Claim 11. A system in accordance with Claim 8 wherein to utilize the coordinates of the ROI to scan the object with the ultrasound imaging system the controller is configured to:

instruct a probe mover to move a probe to the coordinates to scan a specific region of the object, wherein the specific region is defined by the coordinates; and

instruct the ultrasound imaging system to scan the specific region of the object to obtain at least one ultrasound image.

Claim 12. A method for viewing an abnormality in different kinds of images, said method comprising:

determining coordinates of a region of interest (ROI) visible on an image obtained using a first imaging system, the ROI including the abnormality;

utilizing the coordinates of the ROI to scan the object with a second imaging system different from the first imaging system; and

registering 3-dimensional (3D) data relative to 2-dimensional (2D) data, wherein the 3D data is obtained using the second imaging system and the 2D data is obtained using the first imaging system.

Claim 13. A method in accordance with Claim 12 wherein registering 3D data relative to 2D data comprises registering 3D data relative to 2D data without using fiducial marks on a patient having the abnormality.

Claim 14. A method in accordance with Claim 12 wherein registering 3D data relative to 2D data comprises registering 3D data acquired using an ultrasound imaging system relative to 2D data acquired using an X-ray imaging system.

Claim 15. A method in accordance with Claim 14 further comprising establishing a relationship between the 3D data acquired using the ultrasound imaging system and the 2D data acquired using the X-ray imaging system.

Claim 16. A method in accordance with Claim 12 wherein registering 3D data relative to 2D data comprises:

obtaining at least six equations having at least six unknowns, wherein each equation establishes a relationship between coordinates of 2D data acquired from an X-ray imaging system and coordinates of 3D data acquired from an ultrasound imaging system; and

solving the six equations to obtain the six unknowns.

Claim 17. A method in accordance with Claim 16 wherein three of the six equations are $x_1x_1-q_1 = r_1(c_1x_{1u_1} + t_1 - q_1)$, $y_1x_1-q_2 = r_1(c_2y_{1u_1} + t_2 - q_2)$, and $z_1x_1-q_3 = r_1(c_3z_{1u_1} + t_3 - q_3)$, wherein (x_1, y_1, z_1) are coordinates in a first coordinate system of a first datum acquired using the ultrasound imaging system, $(x_{1u_1}, y_{1u_1}, z_{1u_1})$ are coordinates in a second coordinate system of the first datum, (q_1, q_2, q_3) are coordinates of a center of projection S at which an X-ray source of the X-ray imaging system is positioned to project the first datum on to a plane from the center of projection, r_1 , c_3 , t_1 , t_2 , and t_3 are five of the six unknowns, c_1 is a length in an along an X-axis of a pixel of a 2D image generated from data acquired using the ultrasound imaging system, and c_2 is a length in an along a Y-axis of the pixel of the 2D image generated from data acquired using the ultrasound imaging system.

Claim 18. A method in accordance with Claim 17 further comprising:

selecting the first datum and its projection on to the plane by:

viewing an extreme point at a boundary of a feature within an X-ray image generated using the X-ray imaging system;

viewing a 2D slice of data obtained using the ultrasound imaging system, wherein the 2D slice is orthogonal to a plane of the X-ray image; and

relocating the 2D slice to visualize the object for a first time in the 2D slice, wherein the extreme point is the projection of the first datum.

Claim 19. A method in accordance with Claim 17 wherein the remaining three of the six equations are $x_2x_2-q_1 = r_2(c_1x_{2u_2} + t_1 - q_1)$, $y_2x_2-q_2 = r_2(c_2y_{2u_2} + t_2 - q_2)$, and

$z2x2-q3 = r2(c3z2u2 + t3 - q3)$, wherein $(x2,y2,z2)$ are coordinates in the first coordinate system of a second datum acquired using the ultrasound imaging system, $(x2u2,y2u2,z2u2)$ are coordinates in the second coordinate system of the second datum, and $r2$ is the sixth unknown.

Claim 20. A method in accordance with Claim 16 further comprising:
obtaining six additional equations having six additional unknowns, wherein each of the six additional equations establishes a relationship between coordinates of 2D data acquired from the X-ray imaging system and coordinates of 3D data acquired from the ultrasound imaging system;
solving the six additional equations to obtain the six additional unknowns; and
averaging a first unknown of the six unknowns with a corresponding first additional unknown of the six additional unknowns.

Claim 21. A method for viewing an abnormality in different kinds of images, said method comprising:
scanning an object using an X-ray imaging system to obtain at least one X-ray image of the object;
determining coordinates of a region of interest (ROI) on the X-ray image, wherein the ROI includes the abnormality;
instructing a probe mover to move a probe to the coordinates to scan a specific region of the object, wherein the specific region is defined by the coordinates; and
instructing an ultrasound imaging system to scan the specific region of the object to obtain at least one ultrasound image.

Claim 22. A method in accordance with Claim 21 wherein determining coordinates of the ROI on the X-ray image comprises manually marking the ROI on a display device that displays the X-ray image.

Claim 23. A method in accordance with Claim 21 wherein determining coordinates of the ROI on the X-ray image comprises automatically marking the ROI by using a computer-aided diagnosis (CAD) algorithm.

Claim 24. A system for viewing an abnormality in different kinds of images, said system comprising:

- an X-ray imaging system configured to scan an object to obtain at least one X-ray image of the object; and

- a controller configured to:

- determine coordinates of a region of interest (ROI) visible on the X-ray image, the ROI including the abnormality;

- utilize the coordinates of the ROI to scan the object with an ultrasound imaging system; and

- register 2-dimensional (2D) data from which the X-ray image is generated with 3-dimensional (3D) data obtained by scanning the object with the ultrasound imaging system.

Claim 25. A system in accordance with Claim 24 wherein to utilize the coordinates of the ROI to scan the object with the ultrasound imaging system the controller is configured to:

- instruct a probe mover to move a probe to the coordinates to scan a specific region of the object, wherein the specific region is defined by the coordinates; and

- instruct the ultrasound imaging system to scan the specific region of the object to obtain at least one ultrasound image.

Claim 26. A system in accordance with Claim 24 wherein to register 2D data from which the X-ray image is generated with 3D data the controller is configured to:

- obtain at least six equations having at least six unknowns, wherein each equation establishes a relationship between coordinates of the 2D data acquired from the X-ray imaging system and coordinates of the 3D data acquired from the ultrasound imaging system; and

solve the six equations to obtain the six unknowns.

9. **EVIDENCE APPENDIX**

None.

10. **RELATED PROCEEDINGS APPENDIX**

None.